

IMMUNITY PRODUCED BY THE SCHICK TEST.

R. A. O'BRIEN.

Wellcome Physiological Research Laboratories, Beckenham.

In our earlier work on the Schick test we were sometimes much puzzled on finding that a child might give a positive response one week, but when retested a week or two later a negative response. We usually concluded that the test was fallacious and repeated it, perhaps several times, until convinced that the child was really immune. We considered whether the Schick test itself could have any influence but we did not give much serious attention to this hypothesis. The key to the puzzle came from an observation by Glenny and Allen (*J. Hyg.*, 1922, p. 104) that, if a rabbit possessed a basal immunity to diphtheria, the very small amount of toxin in the Schick test dose was sufficient to act as a secondary stimulus and cause a rapid increase in the antitoxin content of the blood. Even then, it seemed difficult to believe that such a small amount of toxin as the 1/50th of the lethal guinea-pig dose could influence the immunity of a human being. But in the course of our work many suggestive observations were made and in a group of children tested by Dr Eagleton and Dr Okell we found several children in which the whole process was followed. Thus, C. F. was Schick positive and received the usual three doses of prophylactic; 12 weeks later she gave a negative Schick response. When tested 60 weeks later, to our surprise she gave a clear positive result. The day after the Schick test was done a blood sample was taken and found to contain less than 0.001 unit of antitoxin per c.c., *i.e.* practically nil. This result confirmed the positive Schick response. When tested three weeks later she gave a negative Schick response, another negative when tested a week later and the blood was then found to contain between 0.01 and 0.1 unit by Mr Glenny who made all the antitoxin determinations for us. A child, K. B., similarly was found to have become Schick positive a year after inoculation had converted her into a negative reactor; her blood taken next day showed 0.004 unit of antitoxin per c.c., thus according with the positive Schick response; a week later her blood contained between 0.1 and 0.5 unit. We have six instances in which we were able to get blood samples and follow the increase in antitoxin content following on a Schick test. A realisation of the magnitude and rapidity of the "secondary response" will convince one that the so-called "negative phase" is of no importance in active immunisation of human beings. Kochmann (*Klin. Woch.*, October 1925) has recently suggested that the negative phase is of such magnitude that if one gives a dose of prophylactic to a Schick negative individual one may make him acutely liable to diphtheria. Our whole experience in England is against this suggestion and I can find no support for it in the large American experience. Glenny and Sudmerson (*Jour. Hyg.*, 1921, p. 219) report that an immune individual two days after a dose of prophylactic showed an increase from 0.1 to 0.16 unit, in four days to 0.2 and in fifteen days to 1.0 unit.



